

REMARKS

Claims 1-22 and 24-32 are pending. Claims 1 and 19-22 are amended herein and new claims 27-32 added. Claim 23 has been cancelled. Support for the claim amendments and new claims can be found throughout the originally filed specification, drawings and claims. In particular, support for the amendments to claims 1 and 19-22 can be found, for example, at ¶¶ 38, 48 and 73. Support for new claim 27 can be found, for example, at ¶ 37. Support for new claims 28-31 can be found, for example, at ¶ 35. Support for new claims 32-33 can be found for example at ¶¶ 37, 38 and 69. In the Notice of Panel Decision from Pre-Appeal Brief Review dated October 12, 2006, the Examiner indicated that the application remained under appeal. Applicant requests that the appeal be withdrawn and this Amendment accepted in conjunction with the enclosed Request for Continued Examination. In the Final Office Action dated June 15, 2006, the Examiner took the following action: (1) objected to the specification for informalities; (2) rejected claims 1-4, 6-8, 10-12, 17-21 and 23-25 under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,875,329 to Washizu et al.; (3) rejected claims 1, 5, 7, 9-10, 13-16, 19, 22 and 26 under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,749,736 to Fuhr et al.; (4) rejected claims 1 and 2 under 35 U.S.C. § 101 as claiming the same invention as claim 1 of co-pending Application No. 10/760,139; (5) rejected claims 3 and 4 under 35 U.S.C. § 101 as claiming the same invention as claim 6 of co-pending Application No. 10/760,139; (6) rejected claims 5 and 6 under 35 U.S.C. § 101 as claiming the same invention as claims 7 and 8 of co-pending Application No. 10/760,139; and (7) rejected claims 17 and 18 under 35 U.S.C. § 101 as claiming the same invention as claims 10 and 11 of co-pending Application No. 10/760,139.

Specification

The Examiner requested that various informalities in the specification be corrected. Applicant submits the attached specification amendments correct the informalities, and the objection to the disclosure should be withdrawn.

The disclosed embodiments of the invention will now be discussed in comparison to the applied references. Of course, the discussion of the disclosed embodiments, and the discussion of the differences between the disclosed embodiments and the subject matter described in the applied references, do not define the scope or interpretation of any of the claims.

Instead, such discussed differences merely help the Examiner appreciate important claim distinctions discussed thereafter.

In a disclosed embodiment of the invention, particles are manipulated using dielectrophoresis. Sample fluid containing particles of interest is passed over an insulating ridge. See ¶73. Particles are constrained through dielectrophoresis near an insulating ridge by the application of an electric field across an insulating ridge. See ¶¶38, 73. The ridge geometry itself generates non-uniformities in the applied electric field that constrain particle motion. See, for example, ¶¶ 38, 69. Once the particles are constrained near the ridge, they are transported along the ridge. See ¶¶38, 73. Transport along the ridge may occur through any of a variety of transporting forces. See ¶48. Notably, because non-uniformities are generated by the insulating ridges, fluid can be moved through some embodiments using electrokinetic transport. See, for example, ¶37. Embodiments of the invention do not rely on electrode geometries to create the non-uniform electric field for dielectrophoresis. Systems that do rely on electrode geometries are generally susceptible to a variety of undesirable phenomena, including manufacturing defects, fouling, and bubble generation, among others.

The Examiner has cited U.S. Patent Number 6,875,329 to Washizu. The system disclosed in the Washizu patent relies exclusively on electrode geometries to generate the non-uniform electric field for dielectrophoresis. See col. 10, lines 34-43 and Figs. 3-4. All electrodes require a “hollow space” to generate dielectrophoresis forces in the device. See col. 7, line 66 – col. 8, line 22. The system is designed to concentrate, and hold, particles at these hollow spaces between electrodes. See col. 7, lines 7-22. Once particles are held at this location, they can be observed through the transparent bottom substrate. See col. 15, lines 27-57. The Washizu patent also discloses grooves may be created beneath an electrode, in the vicinity of the “hollow space”. See generally cols. 16- 18 and Figs. 14-15. These grooves increase the space available to contain trapped particles. See col. 16, lines 60-61. Significantly, particles are not transported along the groove. Instead, particles are collected within the groove so there are a sufficient number to measure. Motion into or out of the hollow space disclosed by Washizu, however, is not equivalent to motion along a ridge in Applicant’s disclosed system. The system disclosed in the Washizu patent simply concentrates particles near a vacant space in a specific electrode geometry, in order that they later be viewed. The particles are not moving through the system. In fact, the Washizu system is designed to hold particles in an area for observation and detection.

If particles were in fact moving along grooves, the optical detectors in the Washizu system would be unable to accurately detect and measure them. Furthermore, electrokinetic flow cannot be used to drive particles through the device disclosed in the Washizu patent because the electrodes provided on the channel surface would interfere with any driving electrokinetic field.

U.S. Patent No. 6,749,736 to Fuhr *et al.* discloses electrode arrangements for dielectrophoretic manipulation in a device with walls having apertures. See abstract and col. 14, lines 49-64 and Fig. 15. As particles move along the walls, they are drawn through the apertures according to their size and the electric field generated by nearby electrodes. The walls disclosed in the Fuhr patent completely block the channel; they are what prevents the particles from moving laterally through device, except as dictated by the apertures and electric field. The Fuhr patent does not disclose transporting a particle along a ridge that is capable of having fluid passed over it. Fluid cannot pass over the walls of Fuhr's device, because the walls block the motion of fluid across them. Fluid simply goes around the walls at the location of the apertures. If fluid were allowed to go over the wall of Fuhr's system, undesirable mixing of the particle sizes would occur.

#### 35 U.S.C. § 102(e) Rejection over Washizu

Claims 1-4, 6-8, 10-12, 17-21 and 23-25 were rejected under 35 U.S.C. § 102(e) as being anticipated by the Washizu patent.

Turning now to the claims, some patentably distinct differences between the cited references and the claim language will be specifically pointed out. Applicant has amended claim 1 to recite that the plurality of electrodes are "spaced away from" the ridge. At least this feature distinguishes claim 1 over the Washizu patent because all insulating geometries disclosed in the Washizu patent are directly capped by a conductive electrode. See, for example, Fig. 14B. In contrast, claim 1 specifies the field-generating electrodes are separated from the ridge.

Applicant has amended claim 19 to recite transporting a constrained particle along the ridge utilizing a separate "mobilization force". The claim patentably distinguishes over the Washizu patent at least because the Washizu patent at most discloses motion in or out of a "hollow space" caused, if it occurs, by the application of the dielectrophoresis force concentrating the particles in that area. The motion of particles into and out of the hollow space of Washizu is not driven by a separate mobilization force propelling particles through the system. Accordingly, Applicant's amended claim 19 is distinguished over the Washizu patent.

Claims depending from claim 1, including rejected claims 2-4, 6-8, 10-12, and 17-18 are also allowable because they depend from allowable base claim 1 and further in view of the additional limitations recited in the dependent claims. For example, new claims 31 and 32 specify that non-uniformity in the electric field is generated primarily by the ridge geometry.

Claims depending from independent claim 19, including rejected claims 20-21 and 23-25 are also allowable because they depend from allowable base claim 19 and further in view of the additional limitations recited in the dependent claims. In particular, dependent claim 20 recites the use of electrokinetic transport. The Washizu patent fails to disclose the use of electrokinetic transport of particles. In fact, the systems shown in the Washizu patent are unable utilize electrokinetic transport because the electrodes capping the insulating features would short-circuit any electrokinetic field.

Finally, the Examiner concedes that Washizu's disclosure is confined to "negative ridges." See Final Office Action, page 3. Applicant has added new claims 28 and 30 to recite a "positive ridge." Claims 28 and 30 are accordingly patentable over Washizu for at least this reason, in addition to their dependency from patentable claims 1 and 19, respectively.

#### 35 U.S.C. § 102(e) Rejection over Fuhr

Claims 1, 5, 7, 9, 10, 13-16, 19, 22 and 26 were rejected under 35 U.S.C. § 102(e) as being anticipated by the Fuhr patent.

Amended claim 1 recites a ridge "positioned such that the sample fluid may pass over the ridge." As described above, the walls disclosed by Fuhr prevent sample fluid from passing over. Instead, the fluid must go around the disclosed obstacles. At least for this reason, independent claim 1 patentably distinguishes over the Fuhr patent.

Amended independent claim 19 recites passing a sample fluid over an insulating ridge. As discussed, the device disclosed in the Fuhr patent is limited to disclosure of fluid passing around walls within a device. Claim 19 distinguishes over the Fuhr patent for at least this reason.

Claims depending from the above-discussed independent claims patentably distinguish over the Fuhr patent because they depend from allowable base claims 1 and further in view of the additional limitations recited in the dependent claims. In particular, claims 15 and 16, which depend from claim 1, recite "impedance matching ridges." Impedance matching

ridges are capable of smoothing out an electric field gradient, and are generally parallel to the fluid flow. The Examiner suggests that the Fuhr patent discloses impedance matching ridges (see Final Office Action, page 5). However, as discussed above, the walls disclosed by Fuhr are simply physical barriers of the sorting areas of Fuhr's device. See col. 14, last paragraph. The walls contain various size gaps that serve to sort particles according to physical size. Fuhr's walls are not designed or selected to smooth out an electric field gradient, nor do they do so in practice. Fuhr's aperatures simply create a physical space for a particle to pass. Claims 15 and 16 are additionally patentable over Fuhr for at least this reason.

Double Patenting

Claims 1 and 2 were provisionally rejected under 35 U.S.C. § 101 as claiming the same invention as that of claim 1 of copending Application No. 10/760,139 ("the '139 application"). Claims 3 and 4 were provisionally rejected as claiming the same invention as that of claim 6 of the '139 application. Claims 5 and 6 were provisionally rejected as claiming the same invention as claims 7 and 9 of the '139 application. Claims 17 and 18 were provisionally rejected as claiming the same invention as that of claims 10 and 11 of the '139 application.

Applicant respectfully submits that the provisional rejections of claims 1-2, 3-4, 5-6, and 17-18 under 35 U.S.C. § 101 is improper, and the provisional rejections should be withdrawn.

Statutory double patenting is described in § 804(II)(A) of the MPEP, which states that the test for double patenting under 35 U.S.C. § 101 is whether "a claim in the application could be literally infringed without literally infringing a corresponding claim in the patent." See *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970). The MPEP continues, stating "[i]s there an embodiment of the invention that falls within the scope of one claim, but not the other? If there is such an embodiment, then identical subject matter is not defined by both claims and statutory double patenting would not exist."

Applicant respectfully submits that none of the cited claims of the '139 application meet the above test for statutory double patenting. Using claim 1 as an example, claim 1 of the present application recites "an insulating ridge" while claim 1 of the '139 patent recites "a non-uniform array of insulating features." Accordingly, a device including a single insulating ridge but not a non-uniform array of insulating features may be within the scope of

present claim 1, but not within the scope of claim 1 of the '139 application. Therefore, the two claims do not define identical subject matter, and a statutory double-patenting rejection is improper. The statutory double patenting rejections under 35 U.S.C. § 101 should therefore be withdrawn.

Interview Summary

Applicant acknowledges with appreciation the telephone interview on August 3, 2006 and receipt of the Examiner's interview summary dated August 22, 2006. During the interview, Applicant's representatives Ed Bulchis and Jennifer Lane discussed the Washizu and Fuhr references with the Examiner. The Examiner continued to assert the references met the claim limitations, as outlined in the Examiner's office action.

All of the claims remaining in the application are now clearly allowable. Favorable consideration and a timely Notice of Allowance are earnestly solicited.

Respectfully submitted,  
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